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Marthamyces chinensis sp. nov. on *Fissistigma* from China

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Abstract — A new species, *Marthamyces chinensis*, collected from fallen leaves of *Fissistigma* sp. in tropical rain forest of Hainan Province, is described and illustrated. The type collection is deposited in the Reference Collection of Forest Fungi of Anhui Agricultural University, China (AAUF).

Key words — *Annonaceae,* morphology, *Rhytismataceae*, *Rhytismatales*, taxonomy

Introduction

Marthamyces Minter, typified by *M. emarginatus* (Minter 2003), is a small genus in the *Rhytismataceae* (*Rhytismatales, Leotiomycetes, Ascomycota*). Members of this genus are usually leaf-inhabiting and are characterized by apothecial circular or angular immersed ascomata not associated with an anamorph, bleached spots and zone lines, a persistent covering layer that often contains crystals, a rather thin subhymenium, cylindric to sub-saccate asci, colorless filiform ascospores that are usually transversely septate, and continuous or septate paraphyses often branched or flexuous at the tips (Minter 2003, Johnston 2006).

The genus was proposed to accommodate nine leaf-inhabiting fungi with filiform ascospores that had previously been treated in *Propolis* sensu Sherwood (1977) and subsequent authors. Johnston (2006) added three new species and a new combination to *Marthamyces*, so that thirteen species are currently accepted in the genus. No *Marthamyces* species has yet been reported from China (Lin et al. 2012).

Materials & methods

The ascomata were observed with a stereomicroscope at 10–50× magnification. After rehydration in water for ca. 10 min, 10–15 µm thick sections of fruitbodies were made using a YD-1508-III freezing microtome (Jinhua, China). Material mounted in

water, KOH solution, Melzer's reagent, cotton blue in water, or lactophenol-glycerin was examined microscopically. The color of internal ascomatal structures was observed in water. Gelatinous caps and sheaths of ascospores were examined in 0.1% (w/v) lactophenol-cotton blue. Measurements were made using material in 5% KOH and from more than 30 paraphyses, asci, and ascospores for each specimen. Point and line integrated illustrations of external status and internal structures of ascomata were drawn using a Panasonic XSJ-2 microscope drawing device (Osaka, Japan). Photographs were taken using a Sony DSC-TX7C camera (Tokyo, Japan), and digital cameras connected to an Olympus CX31RTSF microscope and Olympus SZ2-ILST dissecting microscope (Tokyo, Japan). The type collection is deposited in the Reference Collection of Forest Fungi of Anhui Agricultural University, Hefei, China (AAUF).

Taxonomy

Marthamyces chinensis Y.R. Lin & H.L. Gu, **sp. nov.** Figs 1, 2

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Differs from *Marthamyces emarginatus* by its covering layer composed of basically intact epidermal and mesophyllous cells containing randomly arranged brown to blackbrown angular cells and unevenly sized dense crystals mostly in the inside part of the upper 1/3–2/3, its smaller asci, and its narrower ascospores tapered gradually towards the subacute or rounded base.

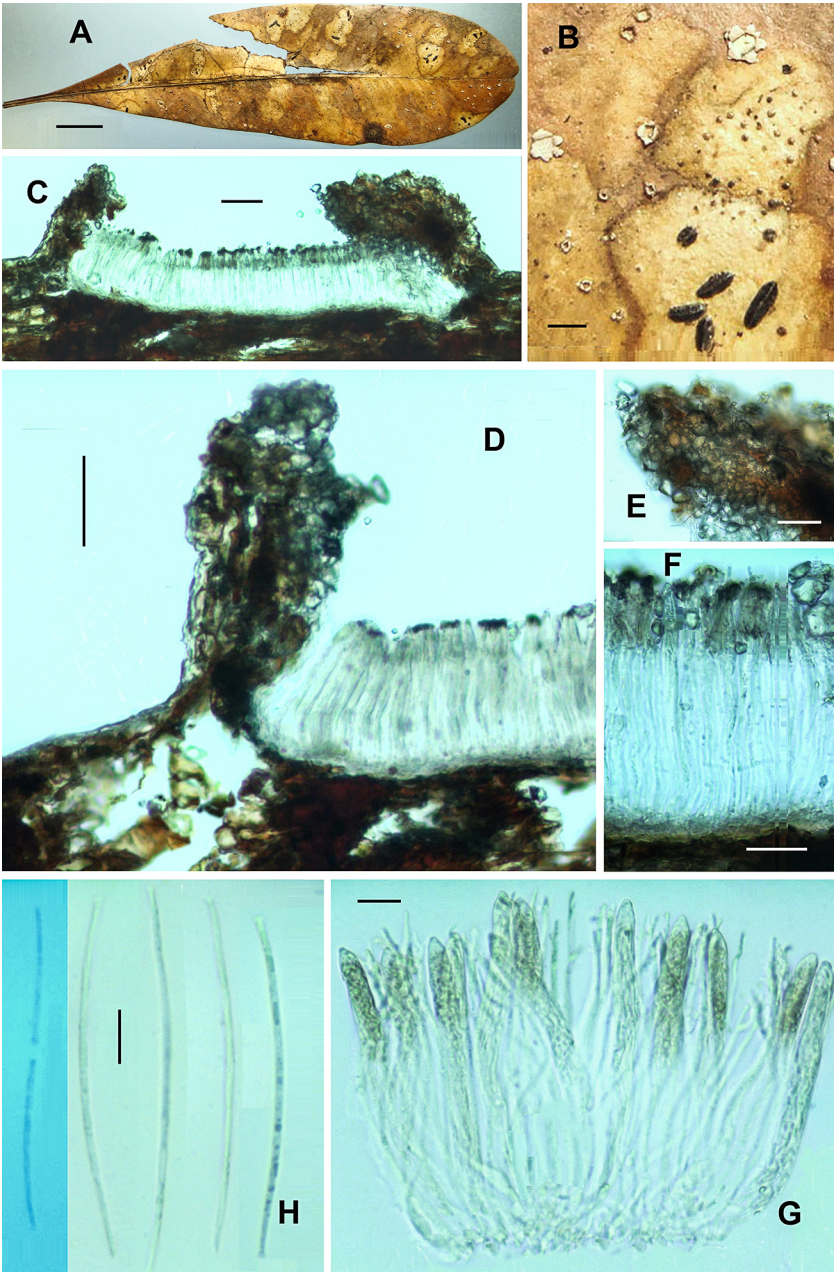
Type: China, Hainan, Jianfengling National Forest Park, Rainforest Valley, alt. ca 700 m, on fallen leaves of *Fissistigma* sp. (*Annonaceae*), 17 June 2014, Y.R. Lin, S.J. Wang, H.Y. Liu & Y.F. Xu 2765 (**Holotype,** AAUF 68873).

Etymology: *chinensis*, referring to the country where the specimen was collected.

Ascomata not associated with bleached spots, zone lines, or an anamorph, developing on both sides of leaves, principally on the upper side of the leaf, scattered or rarely clustered.

In surface view, ascomata 350–530 μm diam., triangular to pentagonal, occasionally elliptical, without a clearly marked outline, initially appearing as patches concolorous with substratum surface, patches becoming raised as ascomata mature, eventually opening by (1–)3–5 somewhat radiate slits, the covering host and fungal tissue folding back as several more or less triangular, grey-pruinose lobes to widely expose the white-pruinose surface of a hymenium. Lips absent.

Fig. 1. *Marthamyces chinensis* (holotype AAUF 68873) on *Fissistigma* sp.: A. Habit on leaf (most of the bleached areas are colonised by *Lophodermium agathidis*). B. Enlargement of ascomata (note immature, mature, and over-mature ascomata and association with *L. agathidis* on bottom right). C. Ascoma in median vertical section. D. Portion of ascoma in median vertical section. E. Detail of apical covering layer. F. Hymenium and lower wall (note crystals in upper hymenium). G. Asci and paraphyses. H. Ascospores. Bars: A =1 cm; B = 500 μm; C, D = 50 μm; E = 30 μm; F = 20 μm; G, H = 10 μm.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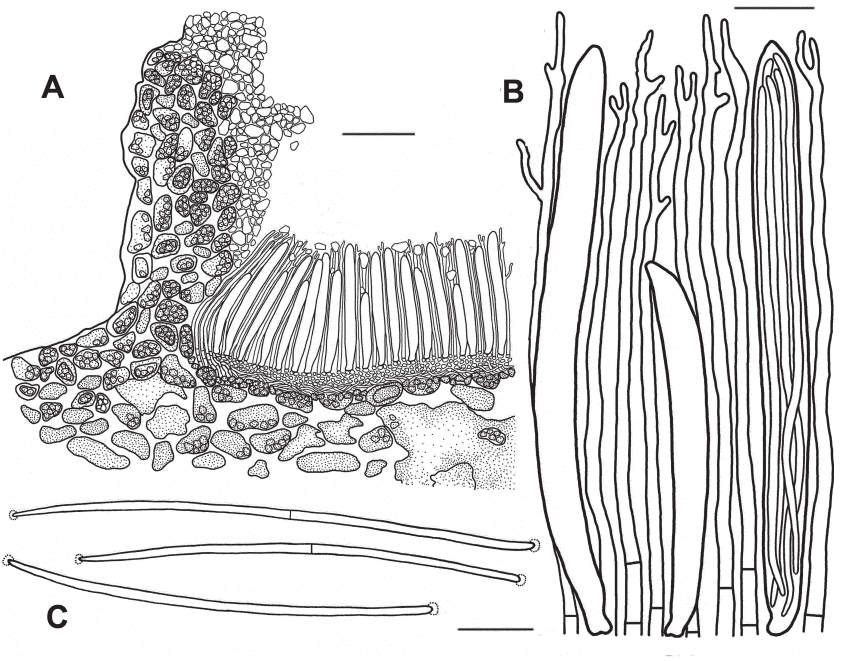

Fig. 2. Drawing of *Marthamyces chinensis* (holotype AAUF 68873) on *Fissistigma* sp.: A. Portion of ascoma in median vertical section. B. Asci and paraphyses. C. Ascospores. Bars: A = 50 μm; B, C = 10 μm.

In median vertical section, ascomata deeply embedded with host cells becoming filled with fungal tissue as the ascoma continues development. Covering Layer 70–130 μm thick, slightly thinning towards the edge, connecting to the lower wall, composed of basically intact epidermal and mesophyllous cells containing sparse to dense, brown, grey-brown or black-brown, thick-walled angular cells 3–7 μm diam., and a group of colorless or pale, refractive crystals of uneven size (3–14 μm diam.) in the inside part of the upper 1/3–2/3. Lower wall somewhat poorly developed, 8–14 μm thick, consisting of black-brown textura angularis-globulosa with thick-walled cells 4–8 μm diam., but a small number of dark fungal cells embedding degraded mesophyll tissue beneath the lower wall. Subhymenium nearly flattened, 10–15 μm thick, composed of colorless textura angularis and intricata. Hymenium colorless or sometimes pale grayish brown in the upper 1/4–1/3, usually intermixed with sparse crystals in the upper layer. Paraphyses 72–80

× 1.6–2 μm, filiform, straight or somewhat tortuous, 1–2-septate at the base, slightly tapered towards the upper, with several short, narrow, irregular branches near the tip, with no gelatinous matrix. Asci ripening sequentially, 65–76 × 5.2–6.5 μm, cylindrical, apex subacute, rounded or subtruncate, smooth, thin-walled, without a circumapical thickening, nearly sessile, J–, 8-spored. Ascospores arranged in a fascicle, 60–72 × 1.2–1.6 μm, filiform, colorless, tapered gradually towards the rounded or subacute base, slightly curved or sigmoid, 0–1-septate, with apical and basal gelatinous caps and an inconspicuous thin gelatinous sheath.

Host species, habitat, & distribution: Producing ascomata on fallen leaves of *Fissistigma* sp. Known only from the type locality in Hainan Province, China.

Comments — The new species is very similar to the *Marthamyces* type species, *M. emarginatus* (Cooke & Massee) Minter, in shape, size, and opening form of ascomata. However, *M. emarginatus* has covering layer composed of remains of broken down epidermal cells, upper wall of ascoma and sparse large crystals, subhymenium comprising angular to cuboidal cells with walls slightly gelatinized, much larger asci ((75–)85–95(–100) × (7–)7.5–8.5(–9.5) μm or 75–100 × 6–8 μm) (Johnston 2006; Cannon & Minter 1986), and wider ascospores (2(–2.5) μm) tapering slightly to both rounded ends. Besides, the upper wall of ascoma is composed of two layers, with the outer layer comprising angular to cylindric cells oriented roughly parallel to host surface and the inner layer comprising rows of short-cylindric cells oriented more or less perpendicular to host surface, with poorly developed periphysoids (Johnston 2006).

Marthamyces quadrifidus (Lév.) Minter is easily distinguished from this new taxon by its triangular or quadrangular, subepidermal ascomata, thinner covering layer (50–65 μm), upper wall composed of two layers (the outer layer very poorly developed, consisting of colorless cylindric cells oriented parallel to host surface, and the inner layer comprising hyaline thin-walled periphysoid-like elements), a subhymenium consisting of angular to prismatic cells, and much larger asci (75–95(–100) × 6.5–9.5 μm) often widest near the base (Johnston 2006).

Marthamyces chinensis is often accompanied by *Lophodermium agathidis* Minter & Hettige, sometimes growing on the same leaves. From our observations, it seems likely that this new species is a weak parasite or a saprobe.

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